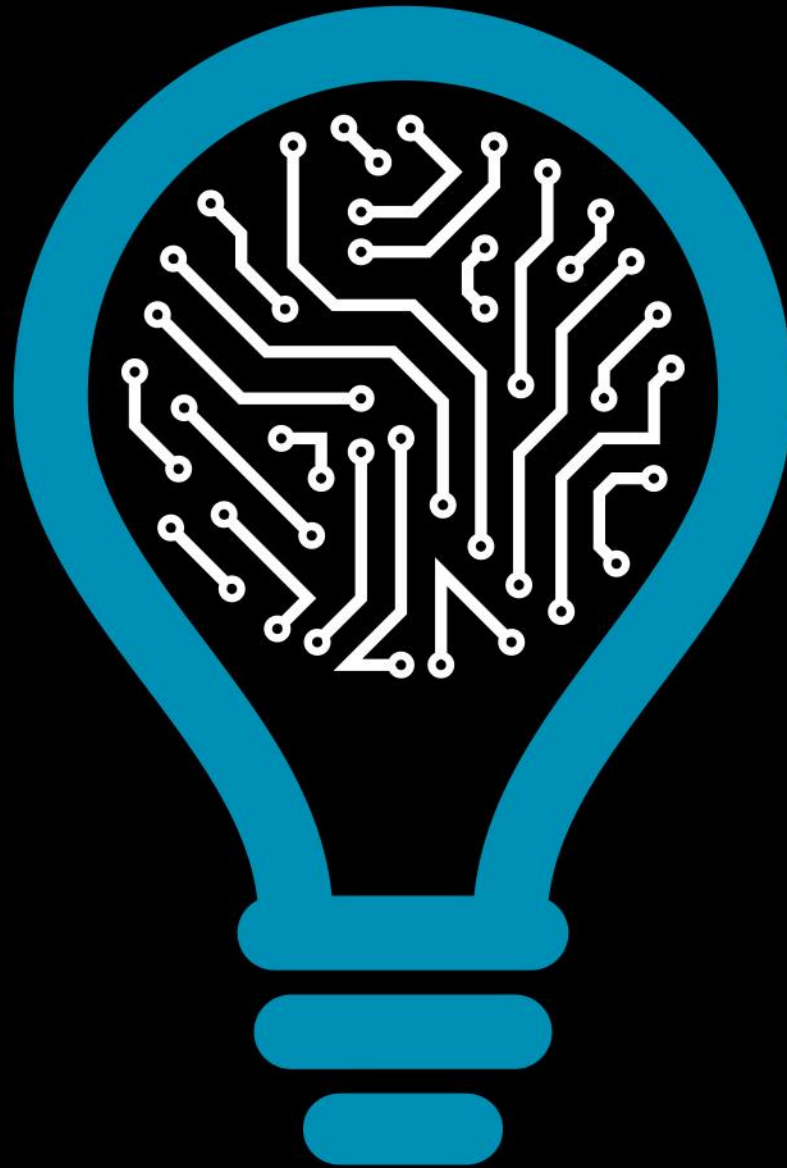


from knowledge  
production to  
science-based  
innovation



**INSTITUTE FOR SYSTEMS  
AND COMPUTER ENGINEERING,  
TECHNOLOGY AND SCIENCE**



# Strengthening the ties between Academia and Society

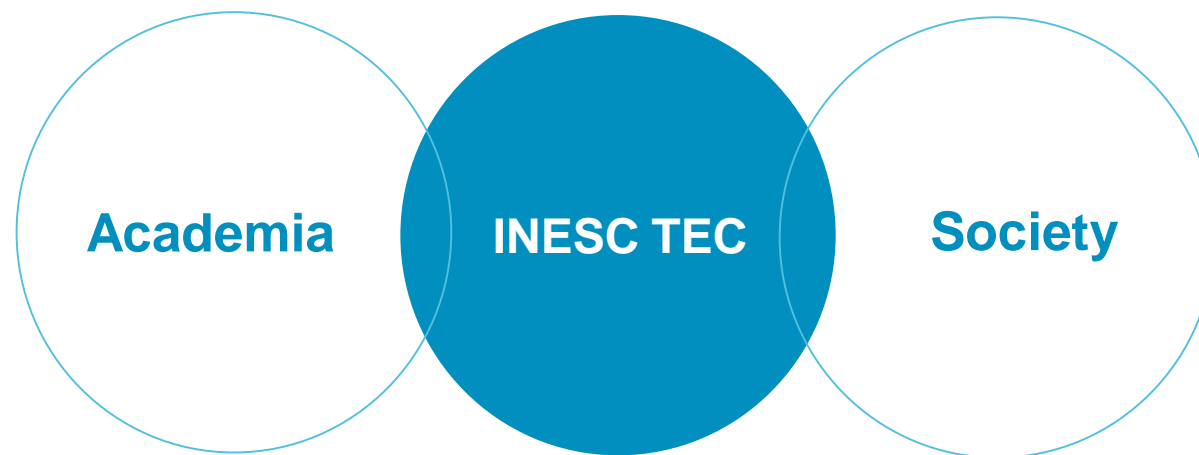
## Vision

To be a relevant international player in **Science & Technology** in the domains of *Computer Science, Industry and Innovation, Networked Intelligent Systems, and Power & Energy*

## Mission

**Foster Pervasive Intelligence**  
Contribute to the competitiveness and internationalisation of Portuguese companies and institutions

**Excel in research**  
To be socially relevant  
To be internationally influential



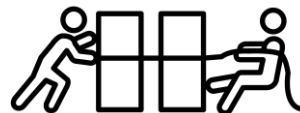


# Putting pervasive intelligence to work

## Research

Clusters - Science push

Clusters of research centres build a multidisciplinary environment to optimize resources and maximise synergies



## Innovation

TEC4 - Market pull

Strategy driven platforms addressing and impacting great societal challenges and market needs





# INESC TEC is international

## Research partnerships

MIT Portugal

UT Austin | Portugal

CMU | Portugal



IBM Q Network



## Innovation partnerships



## European organisations

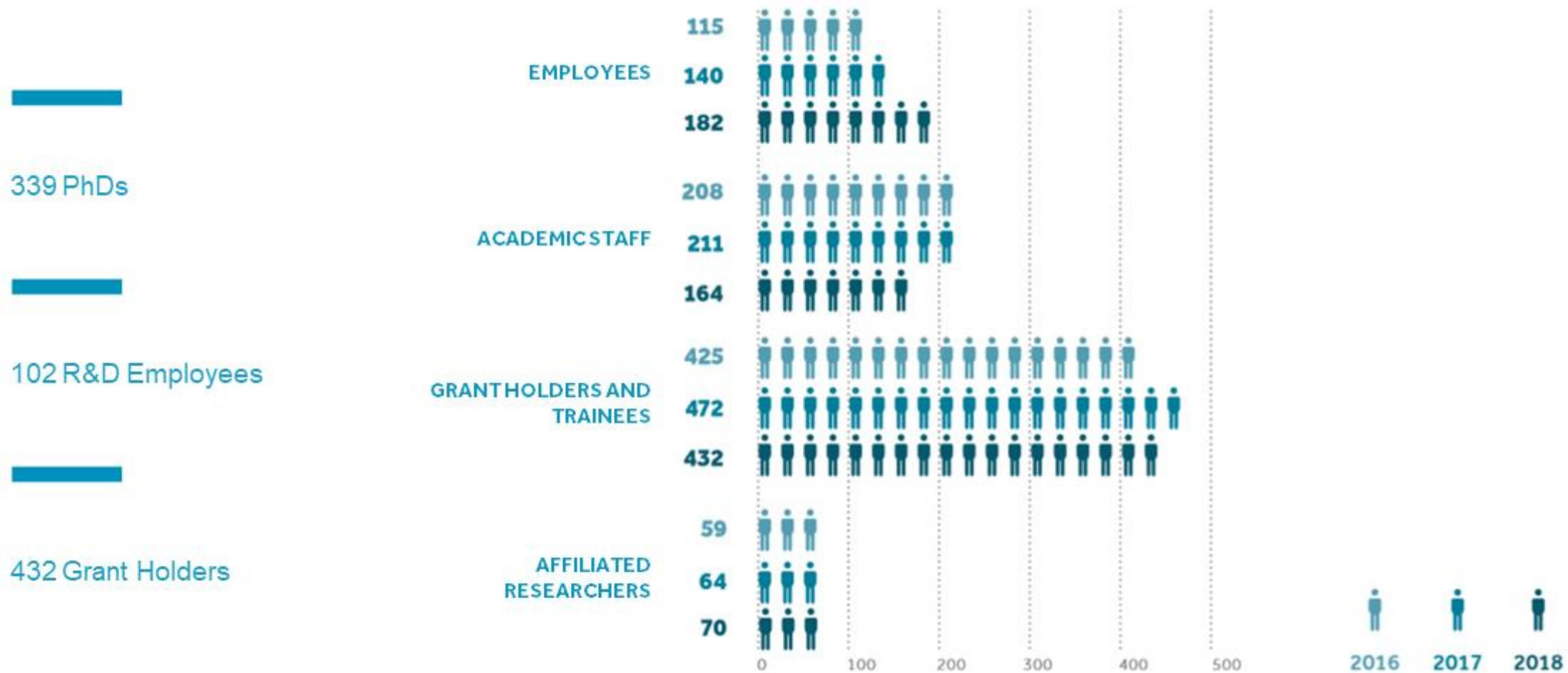


## European strategic initiatives



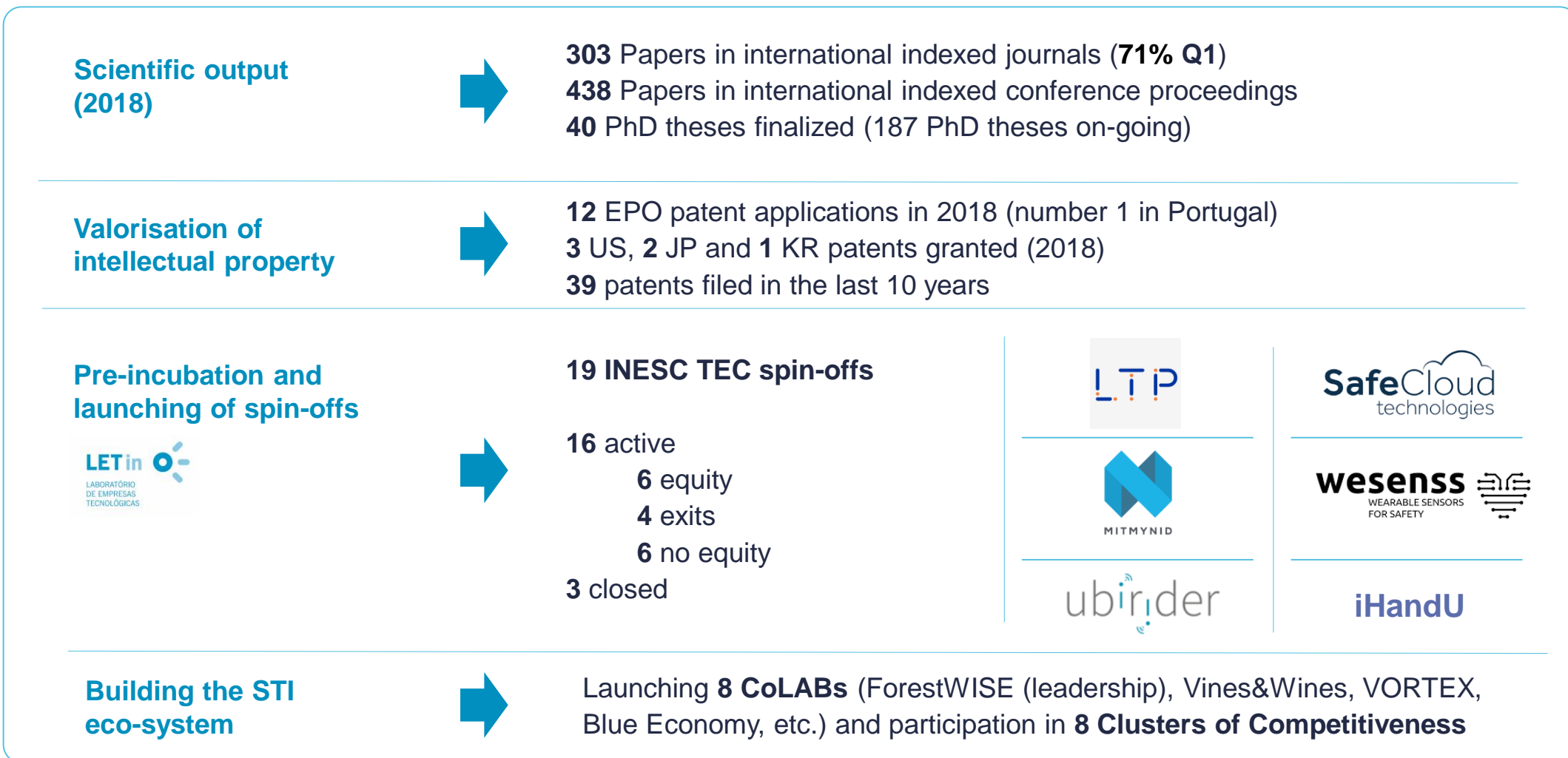


# PEOPLE ARE OUR GREATEST VALUE: SCALE, DENSITY AND CRITICAL MASS





# Spinoffs are the ultimate stage of former successful research

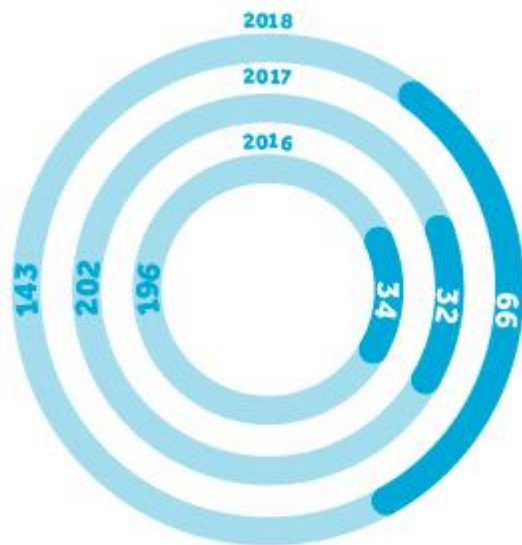




# A talent incubator



**More than 200 professionals** transferred to the market per year (around 18 countries)

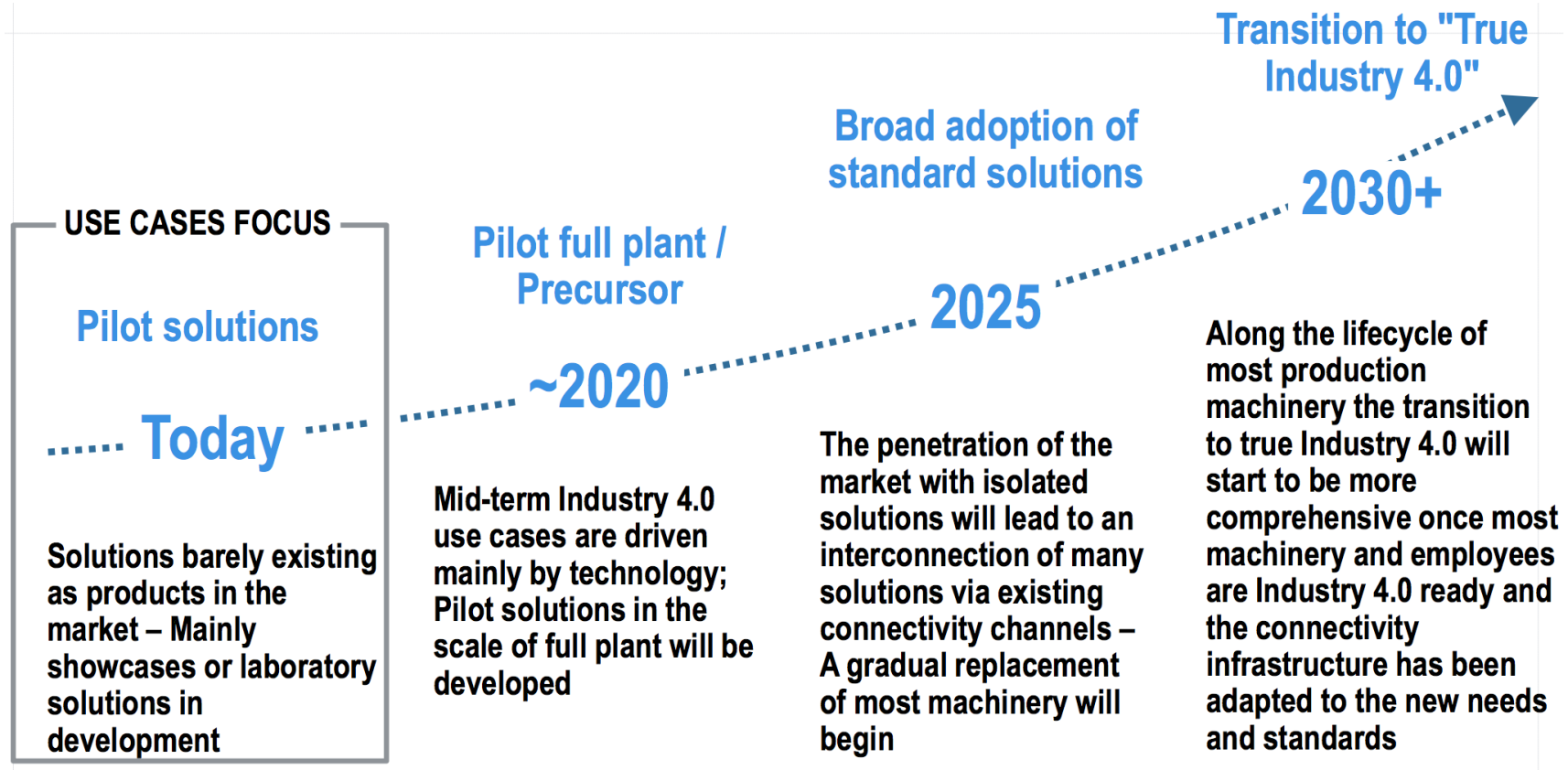


Be/MSc  
PhD



# From Transformation Systems X.0 to Transformation Systems 4.0

Industry 4.0 will have about 10-15 years to reach maturity



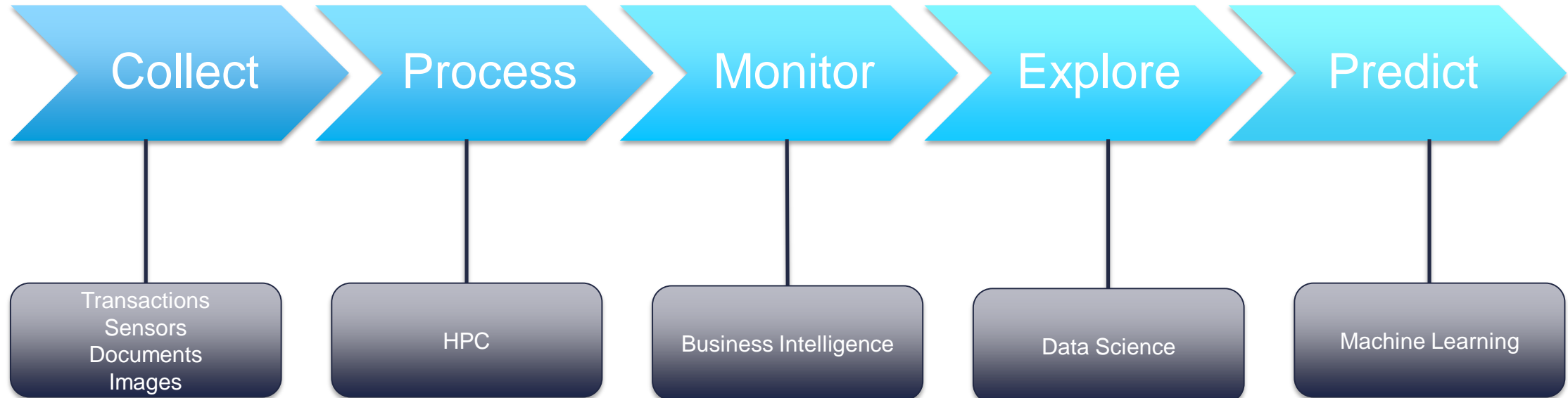


# Digitalization Processes

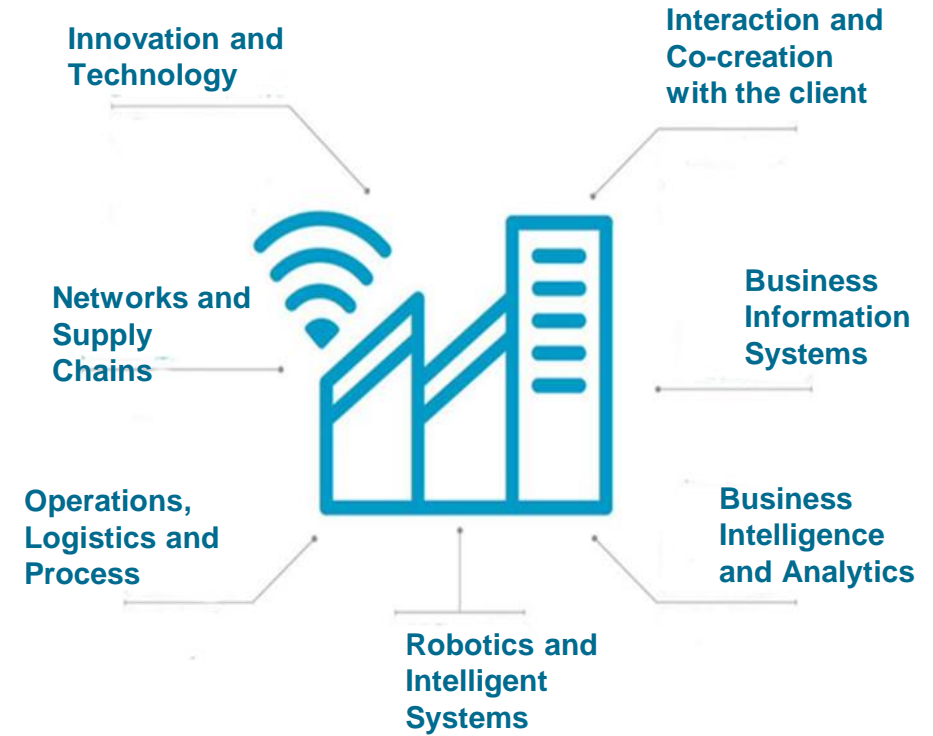
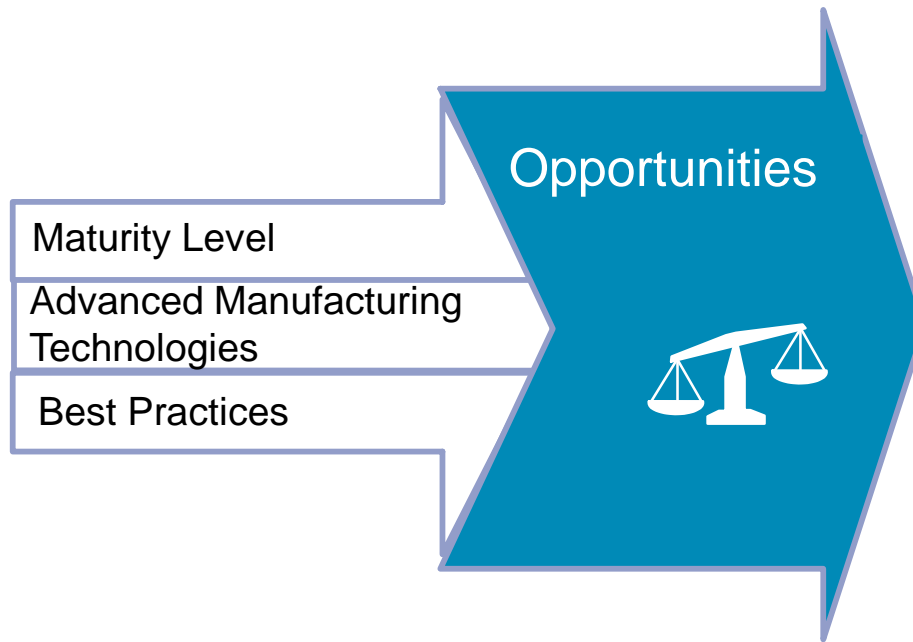
## Value Chains



## Data Driven Organizations

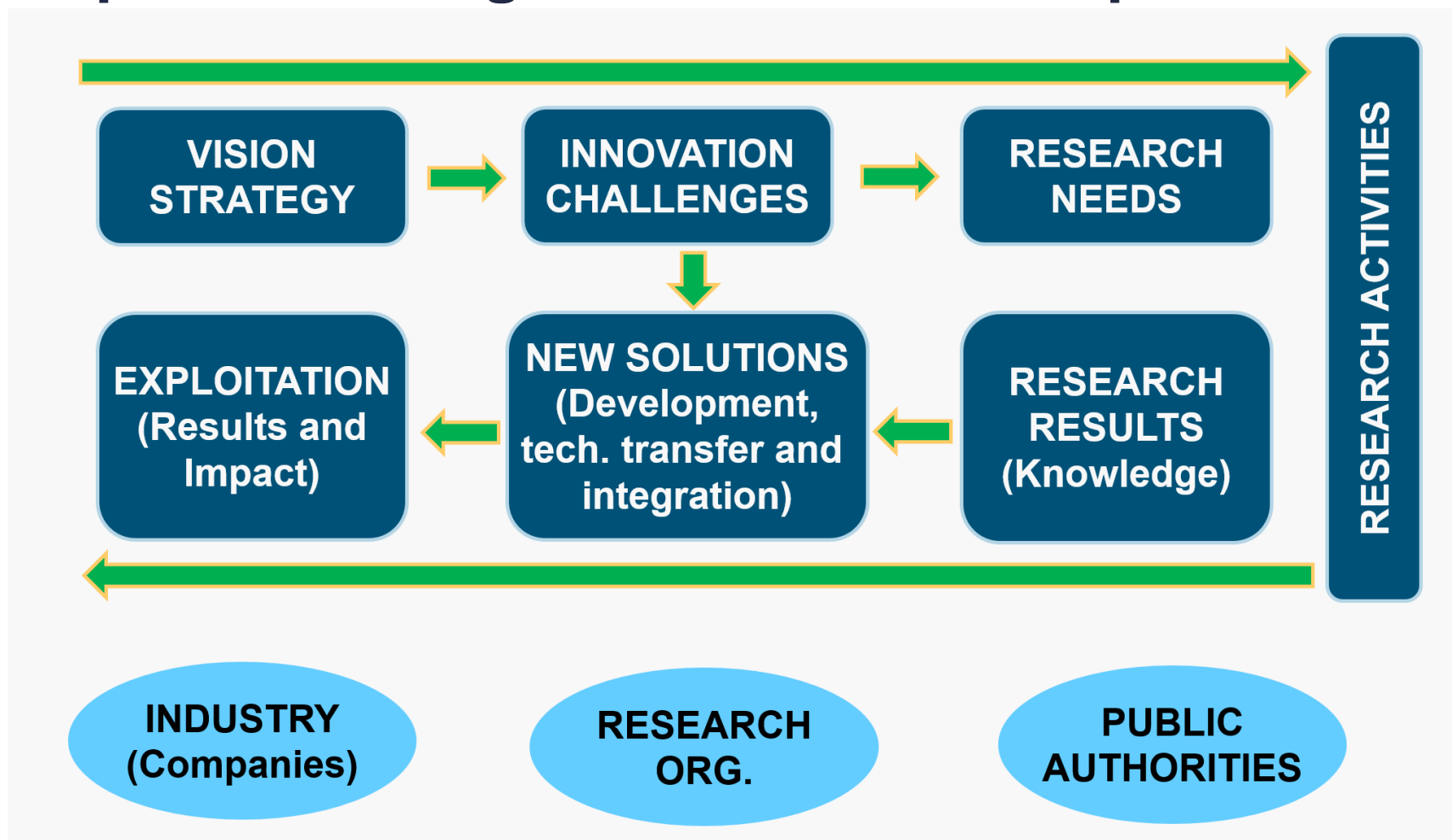


# Design an i4.0 Organization



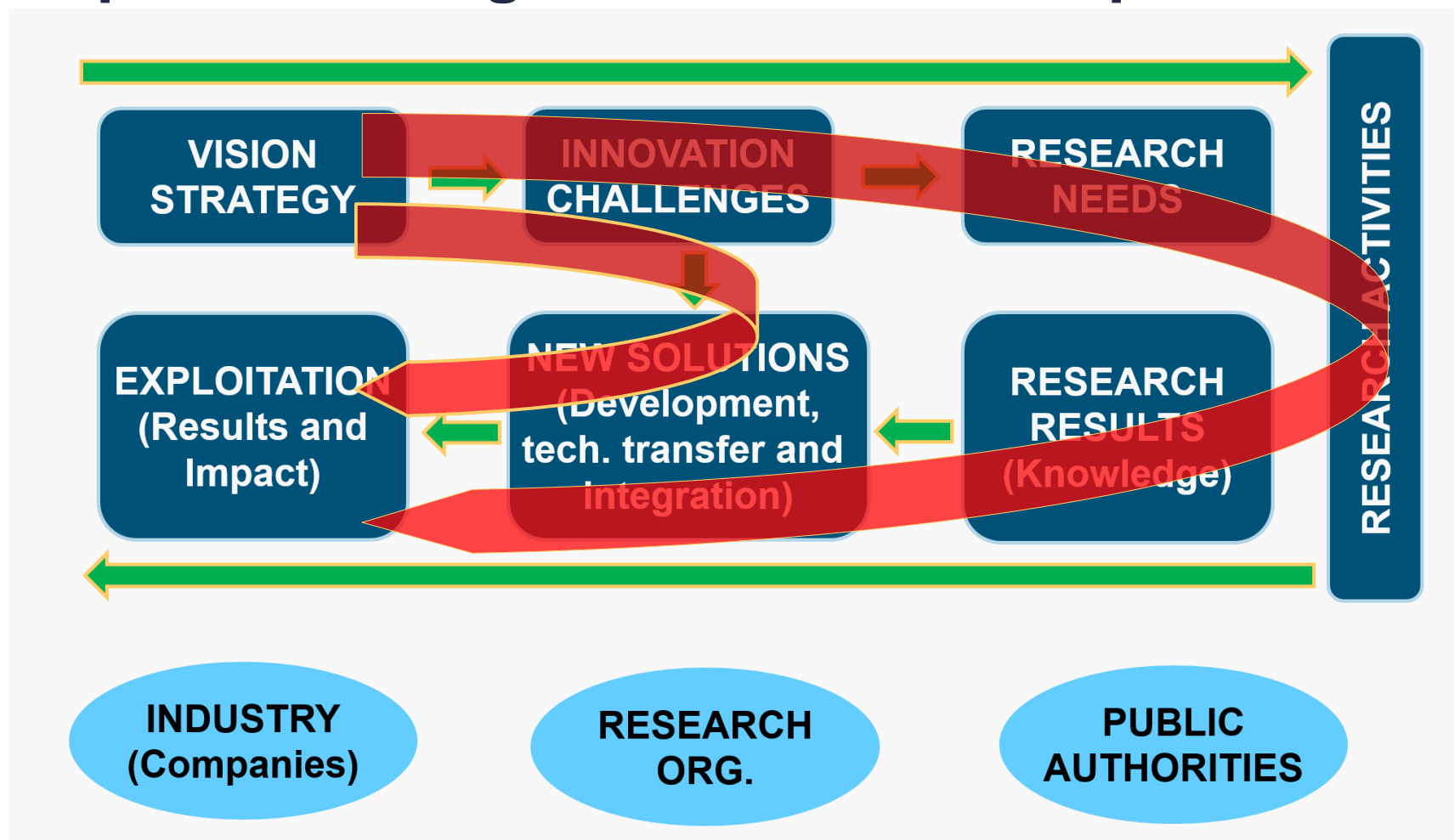
# Innovation cycle and its main activities

## Roadmap / Knowledge valorization / Impact



# Innovation cycle and its main activities

## Roadmap / Knowledge valorization / Impact



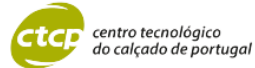
# iMan Norte Hub (DIH) | Stakeholders

## iMan Norte Hub Coordination:



UPTEC

PARQUE DE CIÊNCIA  
E TECNOLOGIA  
DA UNIVERSIDADE  
DO PORTO



Regional, National and  
European Platforms, Agencies  
and Authorities

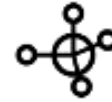


## Competence Centers



R&D Organizations  
Technological centers

## Industrial Ecosystem



Manufacturing companies  
Industrial Associations  
Clusters

## Start-ups Ecosystem



Incubators  
Science and Technology Parks

Labs,  
Demonstrators  
and Experimental Facilities



Production Technology  
Suppliers



Cyber-physical systems and robotics  
solutions providers

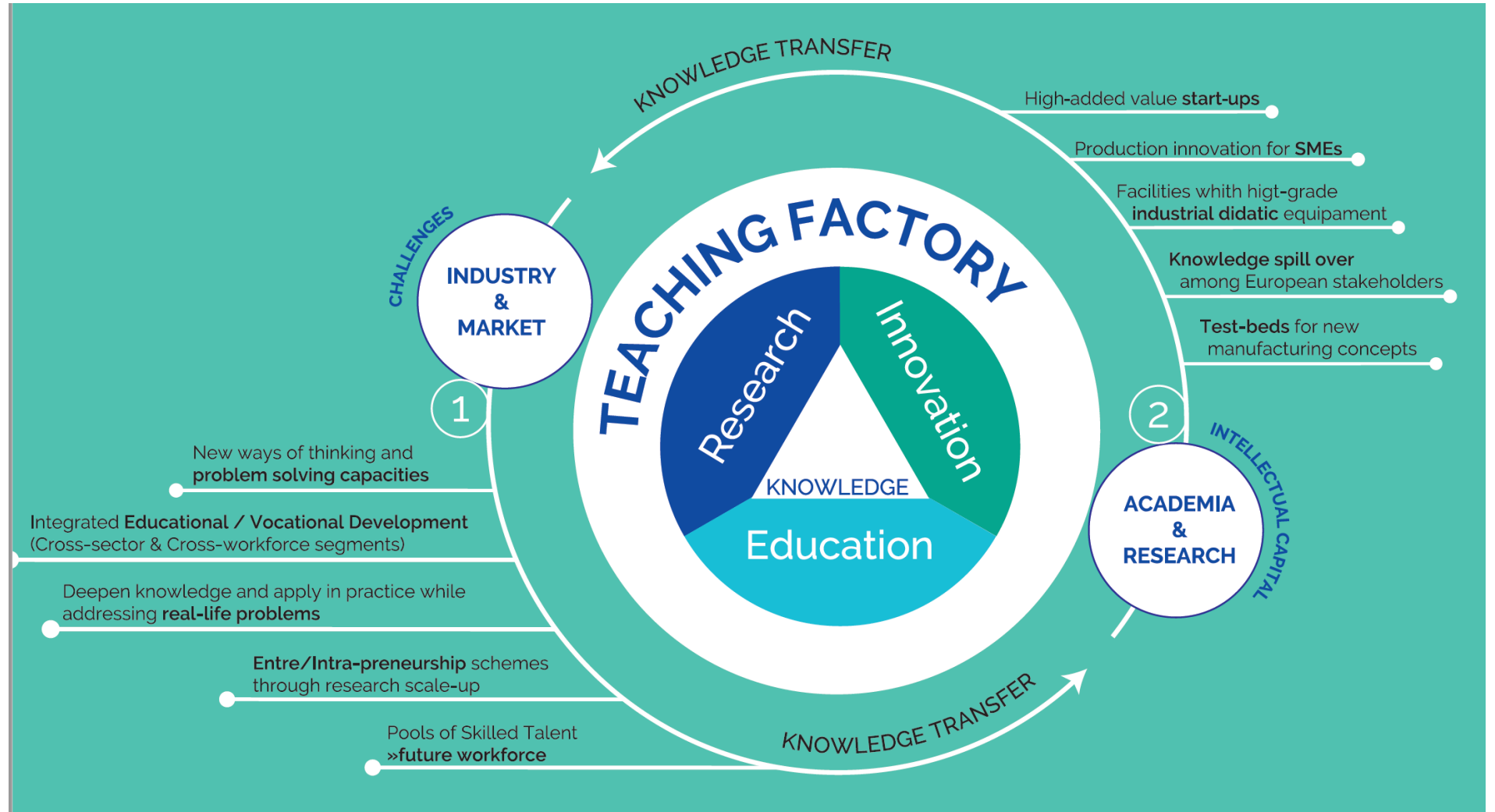
Education &  
Training Ecosystem



Universities  
Business Schools  
Training Centers



# The Challenge of Education and Training





**Disseminate** the state-of-the-art  
in advanced production  
technologies by **demonstrating**  
results from research,  
**experimentation** and advanced  
**training.**

**Mission**

# The importance of understanding the potential of technology



## Know and Understand the Challenge of Digital Transformation Technologies

11 Modules

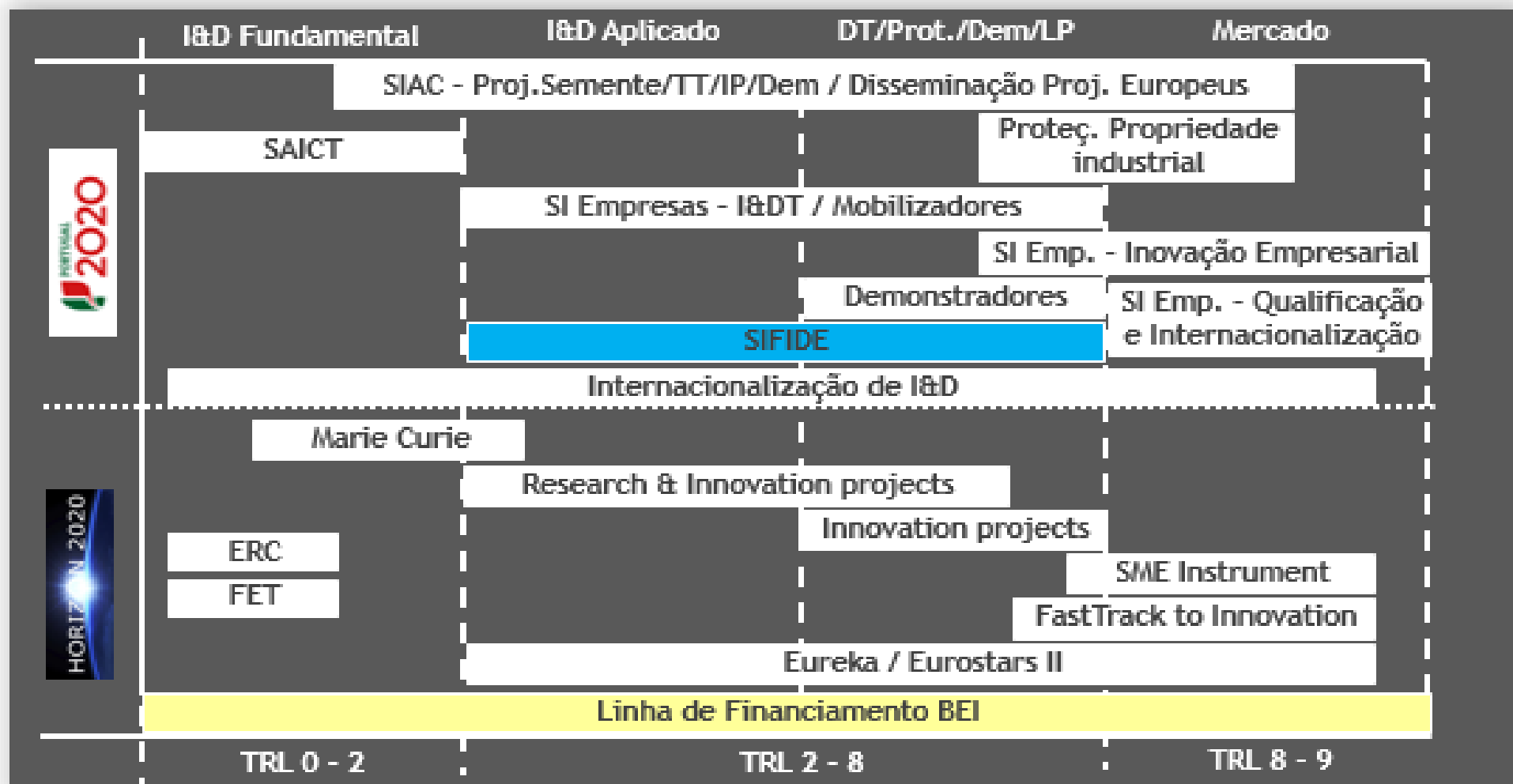
### Objectives:

- To make known the themes involved
- Understanding the potential and implications of adopting each of the technologies
- Examples and Use Cases
- Experiencing technologies in key applications

### Schedule:

- 2 modules per week in different days

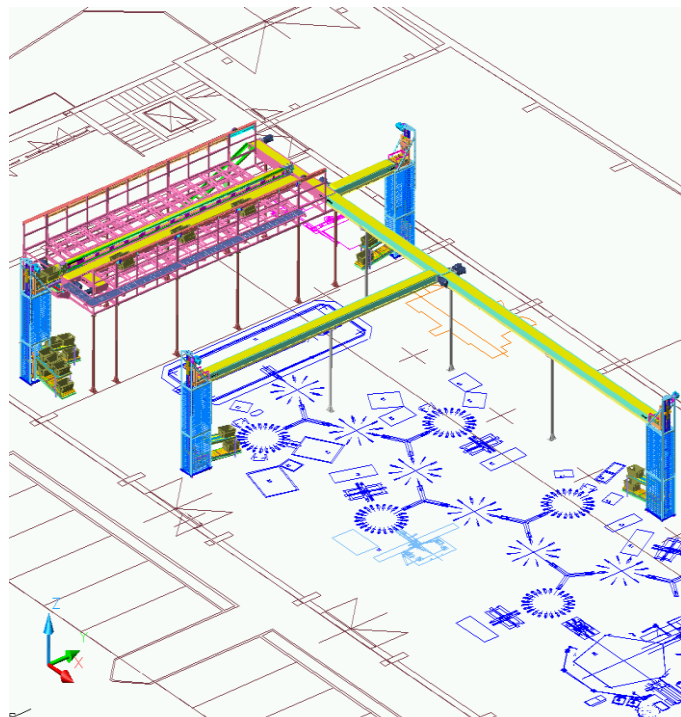
# The Challenge of Funding and Financing



# The Challenge of Funding and Financing: PT2020

Incentive Systems for companies (Areas)	Project Typologies	Contract
Research and Technological Development (R&TD)	<u>Companies – R&amp;TD</u>	<u>Consortium/Individual</u>
	<u>Pilots and Demonstrators</u>	<u>Consortium/Individual</u>
	<u>Large scale mobilizing projects</u>	<u>Consortium</u>
	R&TD Teams in enterprises	<u>Consortium/Individual</u>
	Protection of intellectual and industrial property	<u>Consortium/Individual</u>
	R&TD Internationalisation	<u>Consortium/Individual</u>
	R&TD Voucher	Individual
Entrepreneurship and Business Innovation	Productive innovation for non-PME's	
	Productive innovation for PME's	
	Qualified and creative Entrepreneurship	
	Entrepreneurship Voucher	
Qualification and Internationalisation of SMEs	Internationalisation of SMEs	
	Qualification of SMEs	
	Internationalisation and Innovation Vouchers	

# WORK DONE IN THE PAST (aligning EU and NR) EXAMPLE 1



Development of a Highly Flexible Logistic System for Customized Products



IPP Pilot Plant  
Shoe Sector  
Vigevano – Italy  
Funded by National Funds



Cross Fertilization  
Metalworking Sector (Company)  
Demonstrator  
Porto – Portugal  
Funded with Structural Funds

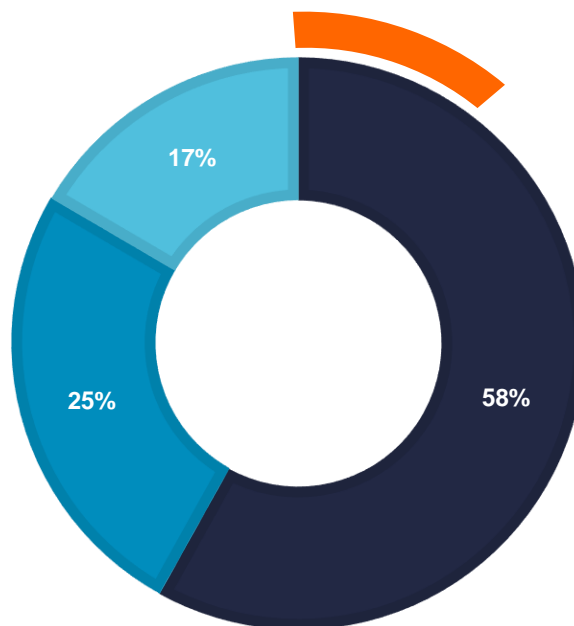




# INESC TEC Funding Model: 1€ FCT strategic funding = 6€

## Diversification and sustainability

- National Competitive Funding
- European Competitive Funding
- R&D and Consulting services
- FCT Strategic Funding



2018

**409** Projects

---

**18M** Funding

---

**27%** of project funding from international sources

*The only Portuguese R&D institution developing projects in each and every societal challenge as defined for the Horizon Europe Research Programme*





# 25+ years partnering with technology vendors and *lead users* in the shoe sector



National projects

**SABE**  
Balancing/Scheduling Support System



**AQUINOS**



**SIMULOG**

Simulation and Operation

**SIBAP**

Production Lines Balancing



**HSSF**

High Speed Shoe Factory



**FASCOM**

Fashion Cognizant Manufacturing



**FOOTURE 4.0**

Roadmap of the footwear sector for the digital economy



**FACAP**

Shoe Factory of the Future



**FATEC**

High Technology for Shoe

**SAPIR**

Support System to the Integrated Planning for Shoe Production Networks



**AGILPLAN**

Agile System for Network Planning



**ShoeID**

RFID



**ADIRA**

Internal Logistics

1985

2018

International projects

**EUROShoe**

Tools for the extended user oriented shoe enterprise



**CICLOP**

Computerised and Integrated Closing Operations



Patented

**CEC-made-shoe**

Custom, Environment, and Comfort made shoe



Patented

**Fit4U**

Framework of Integrated Technologies for User Centred Products



**BEinCPPS**

Cyber Physical Production Systems, integrate a Future Internet based machine-factory-cloud service platform



Simulation Pigment Furniture production line

**IKEA Plants:**  
Portugal  
Lithuania  
Russia  
Czech Rep.

**1994**

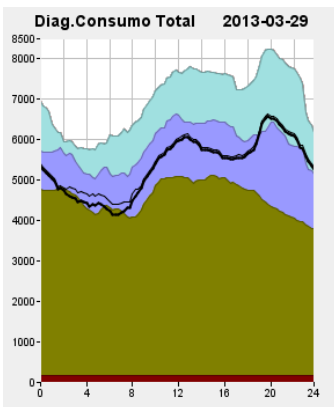
- 240 M € exports  
- 80% of production

**2017**

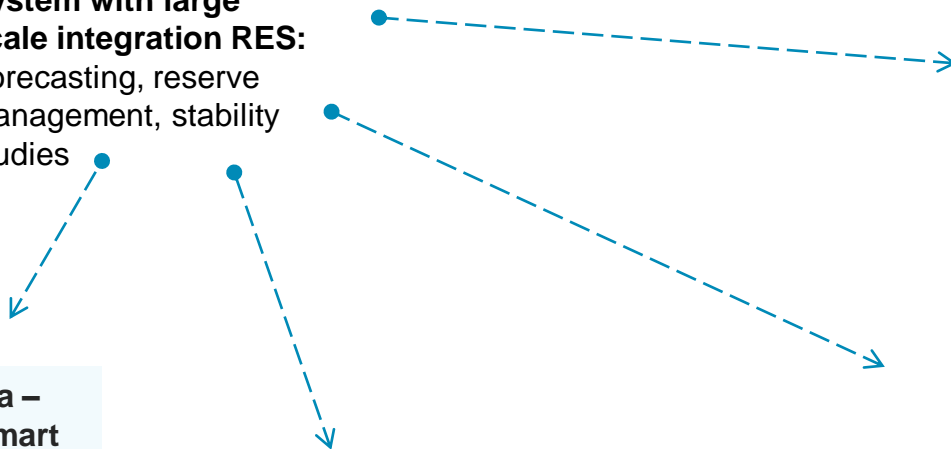
- 2.000 M € exports  
- 95% of production  
- 75 + million pairs



# A leading country in renewable integration – smart grids



**Managing the Power System with large scale integration RES:**  
Forecasting, reserve management, stability studies



> 5100 MW installed capacity in Portugal (7th in Europe)

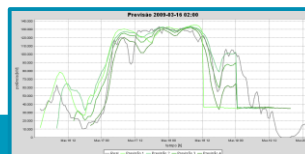
World record: over 4 days with electricity out of hydro, wind, solar, biomass

**Pilot for a Smart City: Évora – 33,000 consumers using Smart Grid technology**

➔ Portuguese Technology on advanced EMS/DMS tools (EFACEC), Smart Metering and Smart Grids solutions



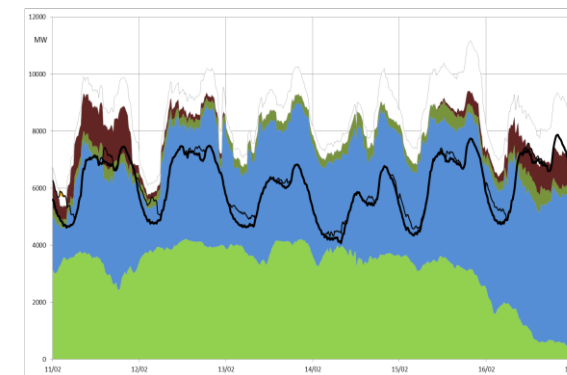
**Prewind**



**Wind power forecasting services**

Provides short-term forecasts up to 72 hours ahead, 4 times per day

75% of the wind power forecasts in Portugal



2016 Feb - renewables enough to feed all the country load and export during 106 h

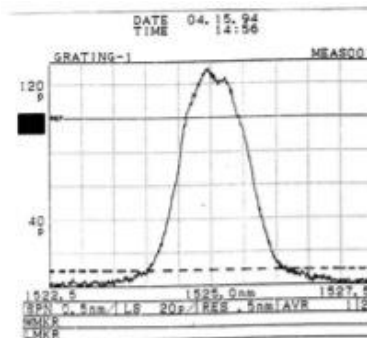


# From the physics lab to international markets

Photonics research started - **1985**



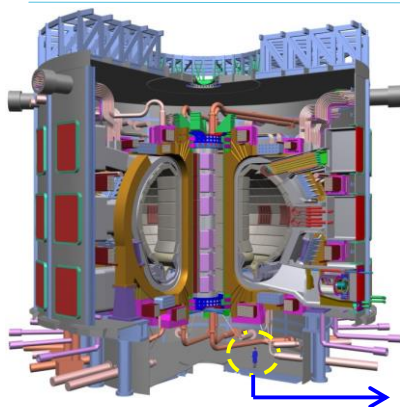
First fiber Bragg grating fabricated in Portugal - **1994**



INESC TEC spin-off in fiber optic sensing - **2004**



**ITER reactor**



Hundreds of FBG sensors to operate at cryogenic temperatures (up to 10 K)

Acquisition by Multinational HBM - **2014**



**FiberSensing**  
bringing light to measurement

**Siemens**  
**Airbus**  
**Thales**  
**Porsche**



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